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bicycle trail system study
phase 1: corridor study
alternatives and environmental assessment

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october 1989

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UNITED STATES DEPARTMENT OF THE INTERIOR / NATIONAL PARK SERVICE

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PURPOSE OF AND NEED FOR THE PLAN

Everglades National Park is in south Florida, adjacent to the fast-growing Miami/Dade County urban area. The tremendous population growth is being accompanied by an increase in bicycling for outdoor recreation. This has resulted in public demands for more and better opportunities for bicycle riding. To help fulfill this need, Dade County is expanding its recreational programs and now has a full-time bicycle coordinator. Bicycling opportunities in Everglades National Park are limited because of inadequate facilities and safety considerations. The purpose of this *Bicycle Trail System Study* is to evaluate alternatives to resolve these problems and to expand recreational bicycling in the park.

Everglades National Park has few roads and only one designated bike route, which is along the 13-mile paved loop road at Shark Valley. This road is closed to private motor vehicles, but bicyclists must share it with tram tour vehicles. The only other park roads are the 38-mile main park road from the park entrance/headquarters to interpretive facilities and the concession complex at Flamingo on Florida Bay, and several short spur roads that lead to interpretive sites and park administrative facilities off the main road. All these roads are narrow (20-24 feet wide), two-lane roads with no paved road shoulders to accommodate bicyclers. Consequently, bicyclers must share the right-of-way with motor vehicles (automobiles, motor coaches, buses, and vehicles towing boats or camping trailers) traveling at speeds up to 55 mph on the main park road. For safety reasons, none of these roads have been designated as bike routes, nor does the park encourage bicycling on them.

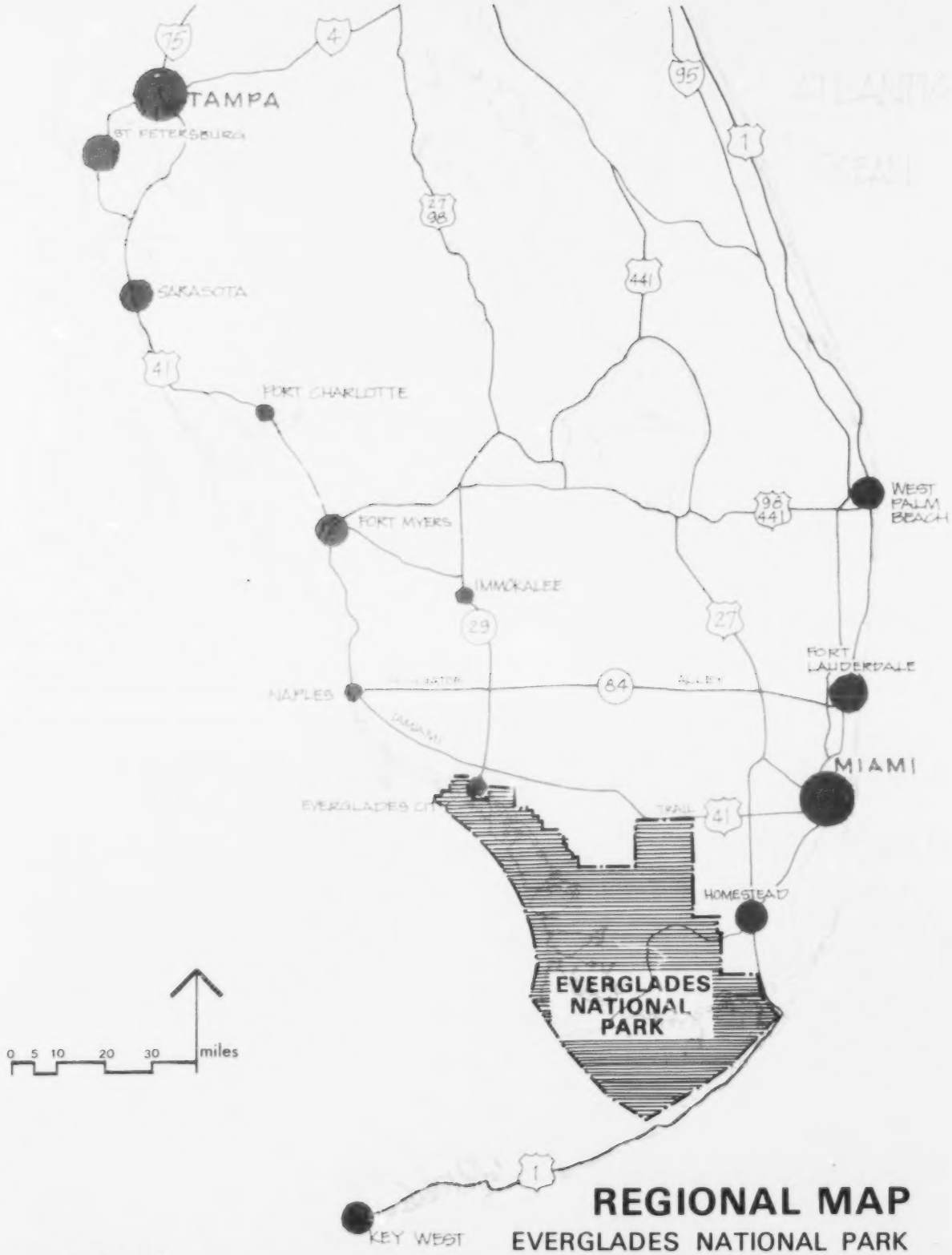
STUDY AREA

The study area for this project is the main park road corridor between the eastern park boundary and Florida Bay, plus all currently used and abandoned roads and trails between headquarters on the north and the intersection of the old Ingraham Highway with the park road on the south, including the Ingraham Highway (see Study Area map). The wild interior of the park – principally, the saw-grass everglades and the coastal mangrove forest – is largely impenetrable and will remain roadless wilderness.

LEGISLATIVE AND ADMINISTRATIVE CONSTRAINTS

Everglades National Park was established in 1947, and it was to be permanently preserved as a wilderness, with no project or plan for visitor use interfering with the preservation of the unique flora and fauna or the primitive natural conditions. In 1978 approximately 93 percent of the park was formally designated as wilderness by Public Law 95-625 and pursuant to the Wilderness Act (see Wilderness Plan map). Federal regulation specifically prohibits "possessing a bicycle in a wilderness area established by Federal statute."

Although most of the roads and trails in the study area are excluded from the park's designated wilderness, there are some exceptions. Portions of fire roads in Long Pine Key are included in wilderness, making them ineligible for bicycle use. New legislation would be required to change the designation of these roads to allow bicycling. Ten miles of the old Ingraham Highway was designated as a "potential wilderness" addition by Public Law 95-625. When the existing overhead powerline that runs along the edge of the road has been placed underground and the road has been obliterated, the corridor will automatically become part of the park's statutory wilderness area. Therefore, the designation of a bike route along this road would require legislation by Congress to delete the corridor from the park's wilderness prior to its authorized use for bicycling.



REGIONAL MAP

EVERGLADES NATIONAL PARK

UNITED STATES DEPARTMENT OF THE INTERIOR
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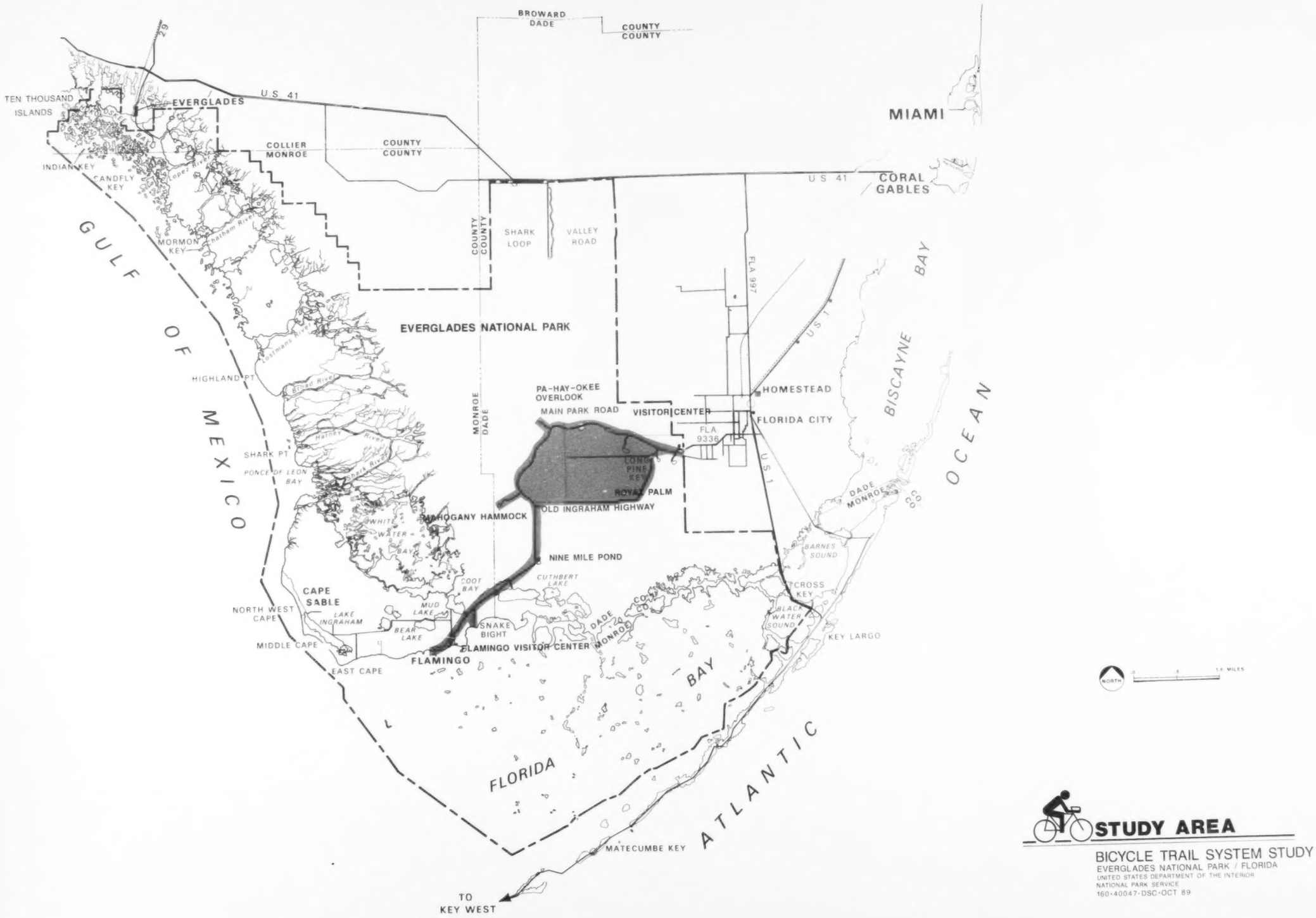
DSC	JANUARY 1986



STUDY AREA

BICYCLE TRAIL SYSTEM STUDY
EVERGLADES NATIONAL PARK / FLORIDA
UNITED STATES DEPARTMENT OF THE INTERIOR
NATIONAL PARK SERVICE
160-40047-DSC-OCT 89

NOTES

ACREAGE

GROSS PARK ACREAGE	1,400,533.00
FEDERAL LANDS	1,400,533.00

	UNIT	WILDERNESS	POTENTIAL WILDERNESS ADDITION
1	TAYLOR SLOUGH	148,700	25,600
2	10,000 ISLANDS WHITEWATER BAY	616,100	56,300
3	PINELANDS	2,400	NONE
4	SUBMERGED MARINE LANDS	529,300	NONE
	TOTAL	1,296,500	81,900

LEGEND

- PARK BOUNDARY
- ROADS MAJOR
- ROADS MINOR
- CANAL, DITCH
- UTILITY LINE
- MANGROVE GROWTH LIMIT
- RANGER STATION
- WATER GAGE OR GAGING STATION
- MUD BANKS
- GAS, OIL & MINERAL RIGHTS
- SUBMERGED MARINE WILDERNESS
- POTENTIAL WILDERNESS ADDITION

WILDERNESS PLAN
EVERGLADES NATIONAL PARK
FLORIDA

AS APPROVED PUBLIC LAW 95-625
NOV. 10, 1978

0 3 6 9 12 MILES

160 | 20,011-B
DEC 78 | DSC

PRIMARY ISSUES

Ensuring the safety of bicycle riders and meeting the diverse needs of bicycle rider groups are the primary issues that will be addressed by this study.

Bicycling safety – Bicycle use along the 38-mile main park road is sporadic, and numbers of bicyclists vary. A hazardous situation exists when individuals or groups ride along the edge of this narrow (24-foot-wide), two-lane road. The lack of road shoulders further compounds the danger when large, fast-moving vehicles pass bicyclists.

Weather also affects bicycler safety. Gusty winds pose problems for even the most experienced cyclists, and wind contributes to rider fatigue, particularly on long open stretches of the corridor. Rainstorms – especially the heavy downpours that are typical in south Florida – make it difficult for motorists and bikers to see, and water on the highway affects traction. The combination of heat and high humidity during the summer greatly affects bicyclers' endurance, and shade and rest shelters should be available.

Bicycle user groups and needs – Just as it is possible to identify a great diversity of park visitors, it is also possible to identify a wide range of bicycle user groups. Recent technological advances have produced an amazing assortment of bicycle equipment and a growing interest and participation in bicycling. Existing and potential bike riders at Everglades may come alone or in large groups (up to 150 at times); they may be serious racing types doing long-distance and high-speed training rides; they may be retirees or families on single- or three-speed bikes, or children on BMX-style bikes; they may be local fishermen from nearby migrant worker camps; or they may be mountain bike riders looking for a challenging off-road experience. It will not be possible to meet the needs of all these groups, and the alternatives considered need to be consistent with park legislation and management goals.

PROJECT GOALS

The goals of this project are to

- Make Everglades National Park a safe place to ride a bicycle.
- Expand bicycling opportunities in Everglades National Park to accommodate the growing diversity of bicycle user groups.
- Provide an alternative means of environmentally compatible recreational access for seeing, sensing, and enjoying the park.

PLANNING OBJECTIVES

Based on the project goals identified above, the following objectives have been developed to guide the formulation of alternatives:

- Extend bicycling opportunities from the (proposed) Dade County trail system to Flamingo in Everglades National Park.
- Separate bicycles from motor vehicles.

- Provide bicycle access from principal in-park origination points to major park visitor use facilities.
- Provide appropriate orientation information to bicycle users.
- Identify and locate desirable facilities for visitor comfort and safety along the bike route.
- Provide a variety of appropriate bicycling opportunities and services in response to the needs of different user groups.
- Route bicyclists through a representative variety of park environments.
- Avoid filling wetlands or interrupting natural water flows.
- Prevent disturbances to park wildlife and wildlife habitat.

STUDY METHODOLOGY

The *Bicycle Trail System Study* for Everglades National Park is being done in two phases. Phase one is a corridor study to identify and evaluate various alternative routes or combinations of route segments within the study area. Phase one will conclude with the selection of a proposed bike trail system corridor.

Phase two will include a detailed design of the proposed bike route system. It will likely consist of section-by-section descriptions of ride characteristics, interpretive resources, support facilities, and design recommendations as to alignments, surface treatments, and trail widths.

DESCRIPTION OF THE ENVIRONMENT

THE EVERGLADES

Water is the dominant resource and is the key to the character and survival of Evergiades National Park. More than half the park is permanently underwater. Two thirds of the park includes marine and coastal estuarine environments, while the inland third is dominated by the freshwater terrestrial environment of the Florida Everglades.

The park has no spectacular geologic formations to provide a scenic backdrop. The sky dominates the flatness of the scene, with high billowing clouds, approaching storms, and brilliant sunsets adding a colorful and exciting visual dimension to the flat and horizontal landscape/seascape of the park. A third of the park encompasses a broad plain that lies nearly at sea level, with a maximum elevation of about 5 feet along the northern park boundary. The center of the plain contains a wide depression known as the Shark Valley Slough, through which the waters of Lake Okeechobee in former years slowly flowed to the sea. The current source of water is from conservation areas in the Florida Everglades sawgrass plain to the north, and the flow usually ceases during the annual dry season (winter and early spring).

Besides the flatness of the land, two other topographic features are distinctive – numerous outcrops of surficial limestone bedrock, called Miami oolite, which provide relatively dry land for forest development; and pinnacle rock formations, which are inches-high projections of knobs and crags that are erosion remnants of the limestone substrate and that render travel by foot all but impossible.

Although the Everglades habitat is hostile to human occupation, it is hospitable to a remarkable diversity of wildlife. The park's plants and animals are a varied assemblage of West Indian and North American life-forms, many near their northern or southern range limits. The flora of the park includes about 1,000 different kinds of seed-bearing plants and many ferns, mosses, and lichens. Plants derived from the West Indian tropics predominate in the southern portion of the park and near the coasts, while temperate zone species from continental North America become more prominent in the northern portion and at interior locations. Continental North American species found in the hammocks include several oaks and ashes, plus red maple, a true dogwood, orchids, and hackberry. Willow, elderberry, cypress, bay, wax myrtle, holly, and magnolia grow in and around tree islands in the glades/prairie area.

CLIMATE AND HYDROLOGY

The subtropical climate of south Florida has shaped the vegetative composition of the park, helping to maintain a unique wilderness environment that posed a formidable barrier to settlement. The climate is characterized by a dry season from November through April, and a hot, humid rainy season from May through October. However, annual rainfall (about 50 inches, or 4 million acre-feet) is insufficient to replace the water lost each year through evaporation, and the region experiences a recurring water deficit during the normal six-month dry season. To offset the scarcity, the region depends on sources from outside the area.

Light frosts often strike the region, with frequency and intensity depending on the quantity of water in a given area. Tropical hurricanes can cause a fair amount of destruction, yet they also reshape the coastline and add tropical species to the ecosystems. Mean monthly

temperatures range from the low to mid 60s during January and February to the middle 80s during July and August.

In addition to local rainfall, two watersheds supply a critical 25 percent of the park's water – the vast Florida Everglades sawgrass plain to the north, and the Big Cypress Swamp watershed of Collier and Hendry counties to the northwest. The Big Cypress Swamp watershed currently supplies about 55 percent of the input from these two external sources, but historically the Florida Everglades sawgrass plain was the park's principal watershed, with water flow coming from rains and the seasonal overflow of Lake Okeechobee.

The distribution of water throughout the year is crucial to the present ecological integrity of the park. The local distribution and activities of terrestrial and semiterrestrial wildlife species depend greatly on the seasonality of water flow. During wet periods animals are generally widely dispersed as a result of well-distributed food sources. During dry periods food supplies are limited to scattered locations in and around wetter habitats, forcing animals to cluster around these environments for food.

VEGETATION COMMUNITIES

The study area contains all the different ecosystems found throughout the park. Nine vegetation community types have been identified: former agricultural lands, cypress prairies and domes, freshwater sloughs, freshwater marl prairies, pinelands, hardwood hammocks, coastal prairies, mangrove forests, and marine and estuarine environments. The locations of these vegetation types are shown on the Natural Diversity map.

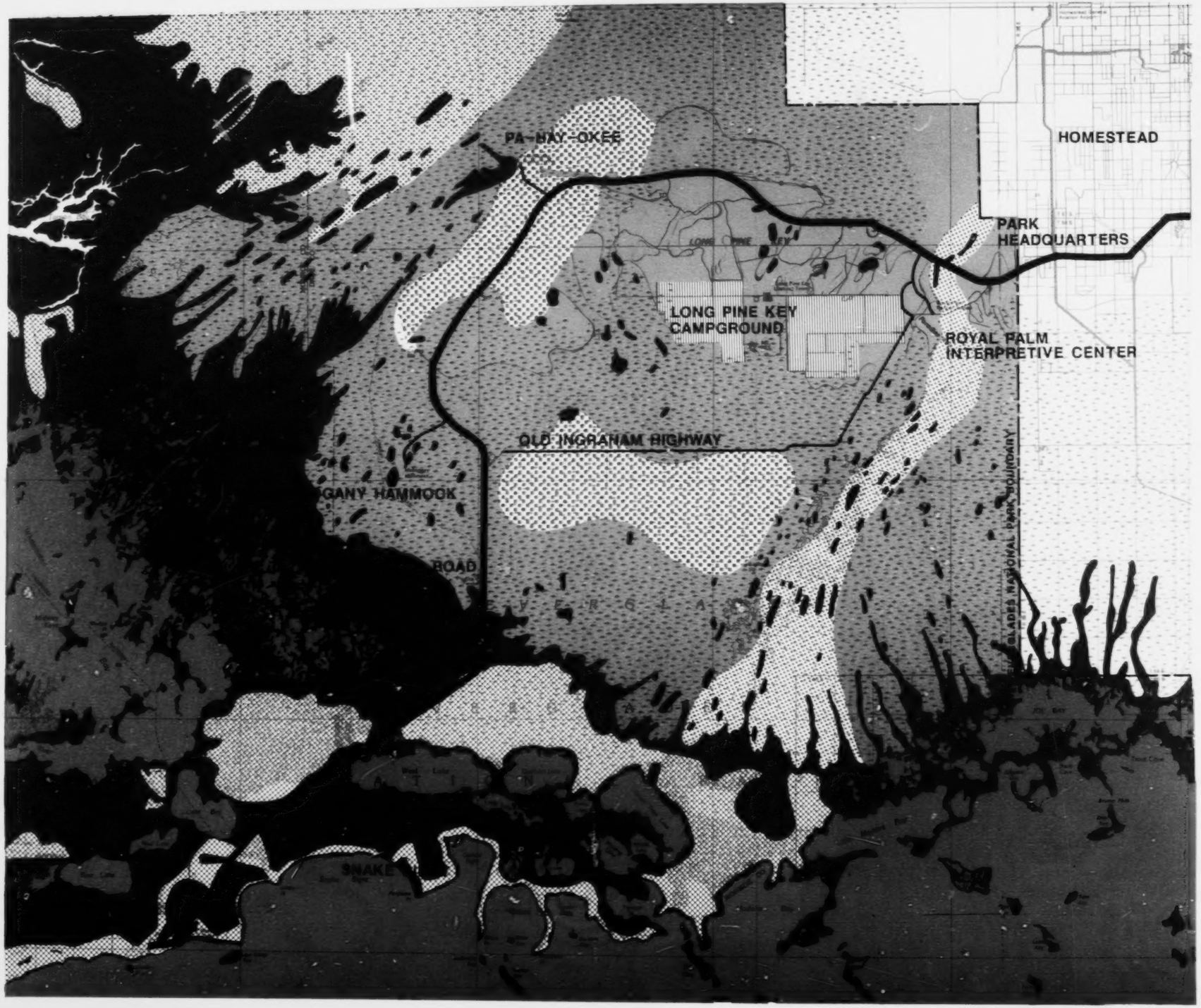
Former agricultural lands have been disturbed as recently as the early 1970s by farming. These lands are now inundated with exotic species, and park resource managers are trying to control the spread of exotics in the area. Future plans for these disturbed lands include trying to reestablish native plant communities.

Cypress prairies and domes are the predominant vegetation type in most of the study area. Cypresses along the main park road in the southeastern portion of the park are dwarfed because of very little humus accumulation, but they may be just as old as the larger trees in the northern park areas. The cypress stands are usually rich in air plants and orchids.

Sloughs are elongated natural drainage channels that are the major watercourses in the park. They are inundated most of the time, and aquatic plants are dominant, with relatively few emergent species. Sloughs are generally a few inches to a few feet below adjacent marshes. Soils are mostly muck or peat, with submerged surface sediments rising and falling with fluctuating water levels. During severe droughts, surface sediments dry out and ground fires may occur; but because sloughs are generally wet most of the year, they have historically served as firebreaks, thus protecting adjacent communities.

Marl prairies occur in areas of bedrock with a thin layer of marl soil. Consequently, they are treeless and are dominated by grasses and grasslike plants. These prairie types are usually wet (a 70-day hydroperiod with a maximum water depth of approximately 8 inches).

Pinelands and hardwood hammocks occupy the higher sites around and within the Florida Everglades Basin. Pinelands, which include slash and Caribbean pine, are found only on slightly elevated areas of bare limestone in the central area of the park. These ridges are flooded about once every five to 10 years, and they are subject to burning once every four to seven years. Fires are critical tc the perpetuation of pinelands, and without such periodic burns, pine forests would succeed to other forest types.



FORMER AGRICULTURAL LAND

MANGROVE FOREST

CYPRESS PRAIRIE/DOME

COASTAL PRAIRIE

FRESHWATER SLOUGH

PINELANDS

FRESHWATER MARL PRAIRIE

HARDWOOD HAMMOCK

MARINE/ESTUARINE ENVIRONMENT

NORTH 0 1 2 3 MILES

NATURAL DIVERSITY

BICYCLE TRAIL SYSTEM STUDY

EVERGLADES NATIONAL PARK / FLORIDA

UNITED STATES DEPARTMENT OF THE INTERIOR
NATIONAL PARK SERVICE
160-40045A-DSC-JUNE 89

In contrast to pinelands, hammocks contain a great variety of broad-leaved trees and shrubs, most of which are of West Indian origin. They are found as islands of dense forest growth in open prairies or marshes. Hammocks occur on elevated bedrock overlain by sandy peat soils, and consequently they are slightly higher than the surrounding area. Hammocks are inundated only during extreme high-water periods, but the soils remain moist because of the shady microclimate. Dominant overstory species are usually oak (laurel, water, or live oak) or tamarind. Oaks are more prevalent in the northern portion of the park than is the frost-susceptible tamarind.

The coastal prairie is a marl flat that rises slightly along the coast and merges into the mangrove forests to the north. It is covered with grass, shrubby vegetation (principally saw palmetto, prickly pear cactus, agave, and seaside lavender), and scattered buttonwood hammocks.

Mangrove forests are the least diverse terrestrial vegetation type in south Florida. Major species include the red, white, and black mangroves, along with the buttonwood species. Most of Florida's remaining mangrove forests are in the Everglades and national wildlife refuges along the coast. Mangroves respond to annual fluctuations in freshwater flows and invade salt marshes when water levels are sufficient in salinity and quantity. Mangroves cannot survive in areas that dry out, and they are found at the seaward edge of marshes only in solution holes where water contact is constant.

The marine/estuarine environment is an area along the coastal portion of the Everglades where fresh and salt water mix. Within this area variations in salinity occur on a daily basis because of tidal flushing and on a yearly basis because of the dry and rainy seasons. Within this environment seven species of rooted vascular plants and 46 taxa of algae, many of which are epiphytic on the seagrasses, have been identified. In low salinity lagoons and lakes basically freshwater vascular plants, such as pondweed, tapegrass, and algaes (such as *Charra* sp.) are most abundant. This area is the most productive for coastal fisheries.

WILDLIFE

The animal life of Everglades is particularly significant and interesting to visitors. In no other national park do so many diverse forms of animals exist in such large numbers, and nowhere else do so many rare and endangered forms find refuge.

The Florida Everglades are home to about 25 species of terrestrial and two species of aquatic mammals, including the Florida variety of white-tailed deer, black bear, panther, opossum, raccoon, bobcat, otter, porpoise, and manatee. With the exception of one or two species of bats, all of the terrestrial mammals are of North American origin.

About 300 species of birds have been identified in the park, and new ones are added to the list nearly every year. South Florida's location makes it a crossroads for migratory birds of West Indian, as well as Central and South American, origin. The majority of North American wading birds, shorebirds, and waterfowl are found here at one season or another. Many North American species are nesting residents, including some that seldom range farther north and others that have disappeared from areas where they once occurred. One reason for the establishment of the park was to protect the nesting areas and feeding grounds of herons and ibis, including roseate spoonbills; great white herons; reddish, great, and snowy egrets; tri-colored (Louisiana) and little blue herons; wood storks; and white and glossy ibis. Other birds dependent on the park for permanent or seasonal refuge are sandhill cranes, limpkins, anhingas, cormorants, brown and white pelicans, and frigate (man-o'-war) birds.

Except for crocodiles and a few kinds of small frogs and lizards from the West Indies, reptiles and amphibians reached the region by coming south from the continental mainland. Many species failed to penetrate as far south as the Everglades, and south Florida has fewer representatives of these groups than do many other places in the southeastern United States. Known reptiles and amphibians include three or four species of salamanders, six species of lizards, 10 species of land and freshwater turtles, several kinds of sea turtles, 12 species of frogs, and 23 species of snakes.

The park's salty and brackish waters support fish species that are widely distributed in similar habitats throughout the Caribbean region. Two main groups make up the freshwater fishes. The first group includes bass, gar, bowfin, golden shiner, and several kinds of sunfish that have found their way down from the north; this group is of rather limited variety because past migration pathways have not allowed easy access for freshwater fish to southern peninsular Florida. The other group includes most of the small minnows seen in freshwater habitats, plus fish that can live in both saltwater and freshwater and that have moved into interior areas from the coast.

The variety of marine invertebrate life in the park is limited by the narrow range of available habitat conditions. Only forms characteristic of shallow water and mud or shell bottom occur, while the more varied life-forms of the coral reefs and rocky shores of other parts of south Florida are largely absent. The mollusk and crustacean groups are the most evident of the marine invertebrates. The beaches in the park are composed almost entirely of broken fragments of shells heaped up by waves. Oyster bars are frequent and seem to develop particularly well in the mouths of the Gulf coast rivers, such as Lostmans and Turner rivers northwest of Flamingo.

Invertebrates, particularly land snails and insects, include a large number that are identical with West Indian species or are closely related to forms found in Cuba and other islands to the south. For bike riders mosquitoes are especially bothersome during the summer.

HUMAN HISTORY

Even though the Florida Everglades are noted for vegetation, wildlife, and water, they also have a fascinating human history that is often overlooked. Prehistoric groups of hunters/gatherers occupied this region as early as 1450 B.C. Spanish explorers came in the 1500s, and Seminole Indians migrated to Florida during the 1700s and 1800s. During the Seminole Wars in the 1800s, several army expeditions penetrated the glades. Soon after, plume hunters, early resort developers, preservationists, and scientists followed them into the area that later became Everglades National Park. Today, few traces of any past activity have survived. However, along the west coast of the park are numerous shell mounds and artifacts of the early Indian occupation.

PARK DEVELOPMENT AND USE

Since establishment of Everglades National Park, the development of visitor facilities has progressed according to a concept of preserving the park's wilderness qualities and minimizing development. This concept has consistently been reflected in the park's legislation, planning, and management. In fact, the nature of the park's resources imposes limitations on use and development. Harsh conditions, such as subtropical heat, storms, insects, impassable terrain, and rough marine waters, render many traditional recreational activities uncomfortable, if not impossible.

Probably more so than any other national park, recreational activities here are oriented to natural history interpretation, environmental education programs, and limited wilderness exploration. Observing the scenery and wildlife is the major preoccupation of most visitors. Boating and fishing dominate in the coastal areas. Camping, picnicking, hiking, and bicycling occur primarily in the limited developed areas of the park.

Because of the character of the park and the concept for its use, a peripheral circulation and visitor-contact system has evolved. The one exception to this peripheral system is the main park road to Flamingo. This road existed in part before the park was established, and it has been rerouted to provide a better interpretive experience for visitors. Most of the park developments lie along this corridor.

The wild interior of the park – principally, the sawgrass everglades and the coastal mangrove forests – is largely impenetrable. The natural composition of the interior severely limits circulation to the natural waterways along the coast. The main park road provides the only cross-park link between these waterways and the peripheral highway routes. This road provides access through most of the major ecosystem/vegetation types, and it will be the core for the development of a bicycle trail system.

BICYCLE TRAIL SYSTEM ALTERNATIVES

OPPORTUNITIES AND LIMITATIONS

The following factors were considered in the development of bicycle trail alternatives:

- existing visitor support and interpretive facilities
- existing roads and trails, and potential starting/destination points
- natural diversity and sensitive resources
- climatic factors
- user group needs

Each of these factors is briefly described below.

Interpretive Developments

Existing interpretive developments represent opportunities for visitors to become oriented to Everglades National Park and to learn about its unique environments. In addition to providing an interpretive element to a bicycling experience, selected sites could also serve as rest stops and weather shelters for bikers. (See Interpretive Developments map.)

Road Segments and Origin/Destination Points

To help develop various bike trail alternatives, the main park road corridor from headquarters to Flamingo and secondary roads and trails were analyzed in terms of segments and origin/destination points. The segments were defined by the intersection of any side road or trail with the main park road. The segments are the basic units that can be combined in a variety of ways to create bike route alternatives. (See Road Segments map.)

Natural Diversity and Sensitive Resources

The Natural Diversity map in the "Affected Environment" section identifies the eight natural and one man-altered environment occurring with Everglades National Park. These areas represent potential opportunities for scenic variety and interpretation for bicyclers. Each alternative would offer a slightly different combination of environments.

Plant and animal habitats identified on the Sensitive Resources map are areas that cannot withstand intense human activity without resulting in the disturbance of the sensitive species that occupy them. In the case of plants and animals that are ecosystem specific rather than site specific (for example, the Florida panther, Cape Sable seaside sparrow, and orchids and bromeliads), any new developments should occur only within previously disturbed areas.

Climatic Factors

Heat, humidity, rain, and wind directly affect bicyclers in Everglades National Park. The dry season (November through April) is the heaviest use season because conditions are more conducive to outdoor activities. More comfortable temperatures and humidity, as well as the relative absence of insect pests (particularly mosquitoes), make this the best time to bike in the Everglades. Also during the dry season wildlife concentrate near water holes, making it easier to see a variety of resident and migratory birds and animals.

The rainy season is much less pleasant for bicycling. Anyone planning a ride during this season must be prepared for heat and humidity, rainstorms, and mosquitoes any time a stop is made in a heavily vegetated area. Many fire roads and trails are regularly covered by standing water. Providing accessible shelter from the hot sun or unexpected downpours at reasonable intervals along a bike route should be considered as a necessity rather than an amenity at Everglades, particularly during summer months.

Wind is a year-round phenomenon and can affect bicyclers much more than one might expect in this flat-land environment. As one cyclist recently reported, "It somehow blew into your face whether you were going or coming. . . . The perfectly flat road begins to feel like a 30 degree hill. A hill with no top to it, and therefore no downhill side" (*Miami Herald*, May 12, 1988). As a result, bicycling can be much more strenuous than a rider anticipates, and it can result in an unpleasant experience.

User Group Characteristics

No scientific user study is available to provide definitive information about bicycle user groups in Everglades National Park. However, less formal research indicates that the following user groups should be accommodated by the park's bicycle trail system if at all possible:

Touring bicyclers

Group Size and Skills	From one or two cyclists to clubs with 100 or more riders. Wide range of age groups – from early teens to 50s and 60s. Usually experienced riders in good physical condition.
Equipment	Typically expensive, rider-owned, 10- to 18-speed touring bikes. Riders usually carry rain gear, water, maps, and a repair kit.
Ride Preference	Relatively long rides (20-100 miles per day) on paved surface without frequent interruptions. Speed varies from 10 to 20 mph, depending on the route and weather conditions. Riders normally choose a road shoulder over a separate bike path if the path is crowded with slower riders or pedestrians or if it is not well maintained. The route is normally predetermined.
Objectives	Strenuous exercise, scenery (primarily large scale), and socialization within the group.

Recreational bicyclers

Group Size and Skills	Small groups of unrelated adults or family groups from two to eight people, including children. Range of experience and physical condition varies from poor to good.
Equipment	Either owned or rented bikes of all types, including one-speed children's BMX-style bikes, three- to 10-speed touring bikes, or fat-tire mountain bikes. Many recreational bicyclers are not equipped with rain gear, water, maps, or repair kits.
Ride Preference	Shorter rides (2-10 miles), with intermediate stops or destinations preferred. Separation from motor vehicles and high-speed riders is important for both physical safety and psychological comfort. Going and return rides along the same route may be preferable to loops because they make it easier for riders to adjust the length of the trip. Rides are not likely to be preplanned.
Objectives	Moderate exercise, scenery enjoyment (at both large and close-up scale), nature study, and socialization.

Mountain bicyclers

Group Size and Skills	Usually small groups of two to six young adults in good physical condition; off-road experience probably varies among the group.
Equipment	Expensive ($300–$900) rider-owned, 12- to 18-speed, fat-tired city or mountain bikes. Riders usually carry rain gear, water, maps, and repair kits.
Ride Preference	Mountain bikers are normally more interested in the challenge than the distance of the ride, and they prefer a variety of terrain. Rides of 10-20 miles are typical, depending on the difficulty of the ride. A destination or loop is usually planned ahead by experienced riders, but spontaneous changes are acceptable.
Objectives	Strenuous exercise and access to more remote locations (destinations are as often related to the challenge of the terrain as to scenic quality, although both are important attributes of the most appealing routes)

Recreational bicyclers at Long Pine Key campground.

Typical wayside pullout on the main park road.

Mountain bicyclers at Long Pine Key campground.

Recreational bicyclers on the access road to Long Pine Key campground.

Touring bikes on the main park road.

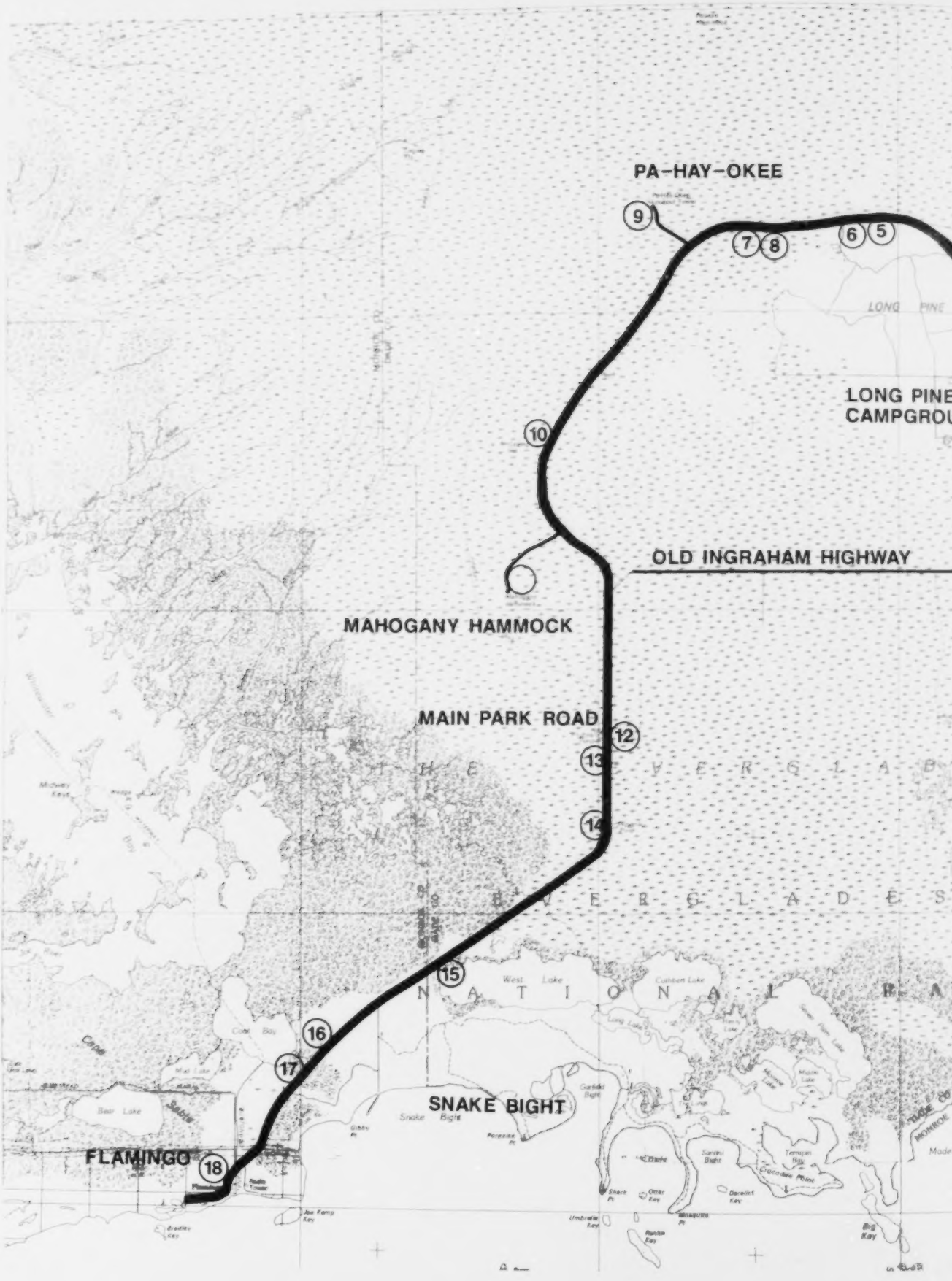
Old Ingraham Highway.

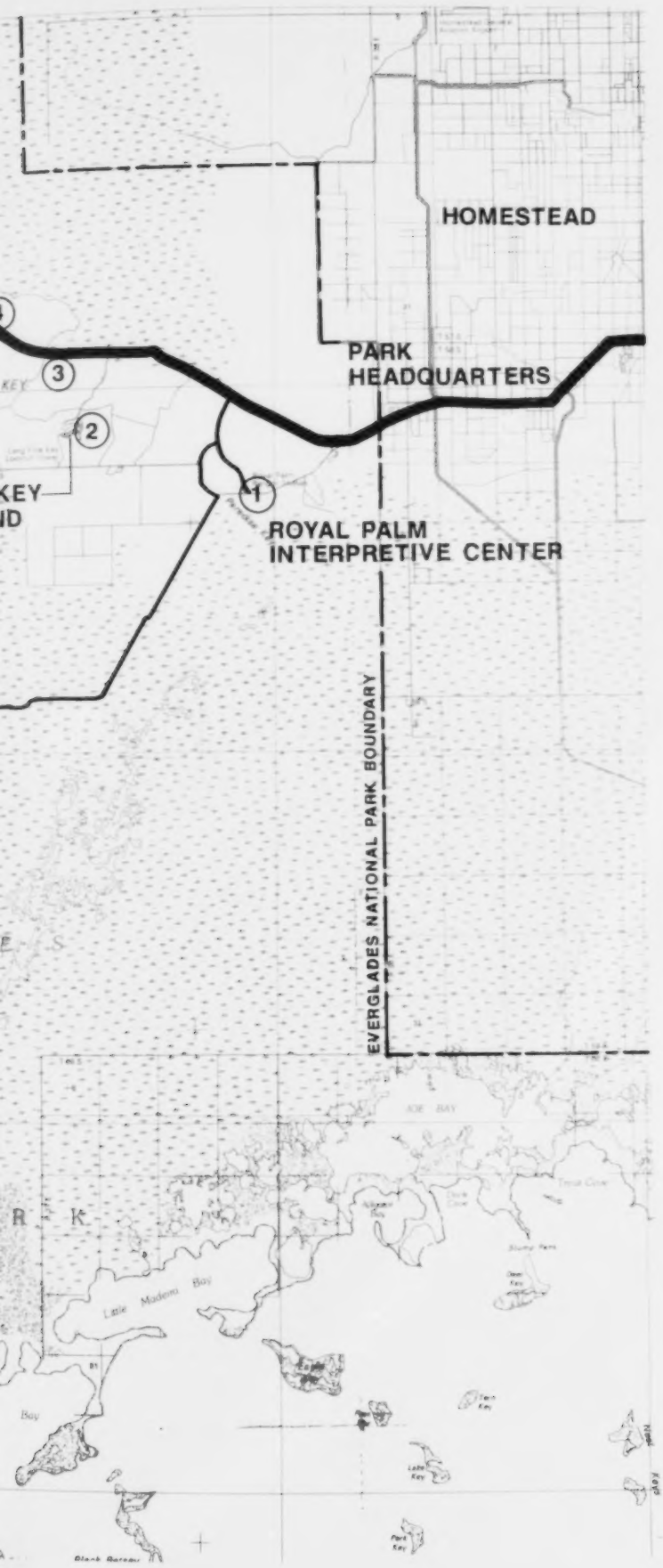
Long Pine Key nature/bike trail in July, the rainy season.

Typical road shoulder and culvert along the main park road.

Taylor Slough bridge, one of two bridges on the main park road.

Access road to Royal Palm.


PA-HAY-OKEE
9
7
8
6
5
LONG PINE
LONG PINE
CAMPGROU
10
OLD INGRAHAM HIGHWAY
MAHOGANY HAMMOCK
MAIN PARK ROAD
12
13
14
15
16
17
18
SNAKE BIGHT
FLAMINGO
Bear Lake
Snake Bight
West Lake
Coot Bay
Canal
Sunbird
Gabbs Pt.
Poresse Pt.
Shark Pt.
Otter Key
Dorsett Key
Mosquito Pt.
Umbrella Key
Rabbit Key
Big Key
Joe Kemp Key
Bradley Key
Crocodile Point
Terrapin Bay
Sandfly Bight
Garfield Bight
Long Lake
Mud Lake
Middle Lake
Nine Mile Pond
Cuthbert Lake
TRAIL TO MONROE
Made



The following is a list of existing interpretive developments along the main park road from the entrance station to Flamingo.

	Development Site	Mile	Interpretive Content
1	Royal Palm (major interpretive development)	2	Exhibit room Taylor Slough ecology Anhinga Trail Wildlife of Taylor Slough Gumbo Limbo Trail Hardwood hammock vegetation
2	Long Pine Key campground	4	Campground & picnic area (no interpretation)
3	Road pullout (wayside pullout)	5.4	Remnant forests of south Florida slash pine
4	Pineland nature trail	6.5	Fire ecology
5	Road pullout (wayside exhibit)	8.9	Pinnacle rock (Miami oolite formation)
6	" " "	9.7	Origin of hammocks
7	" " "	11.4	Origin of "Rock Reef"
8	" " "	11.4	Dwarf cypress forest
9	Pa-hay-okee	12.5	Water cycle Tree islands Wildfire Seasons of the Everglades
10	Road pullout (wayside exhibit)	18.2	Everglades "contradictions"
11	Mahogany Hammock	19.5	Hammock environments Hammock forests vs. temperate forests
12	Road pullout (wayside pullout)	24.2	Mangrove transition zone
13	Paurotis Pond	24.5	Picnic area (no interpretation)
14	Nine Mile Pond	26.5	Wildlife
15	West Lake	30.5	Exhibit room Waterfowl of West Lake Mangrove Trail Influence of hurricanes Mangrove zone flora
16	Mrazek Pond	33.2	Birds of Mrazek Pond
17	Coot Bay Pond	33.7	Birds of Coot Bay Pond American crocodile
18	Flamingo (major interpretive development)	38	Exhibit room Coastal prairie and Florida Bay ecology

NORTH 0 1 2 3 MILES

INTERPRETIVE DEVELOPMENTS

BICYCLE TRAIL SYSTEM STUDY

EVERGLADES NATIONAL PARK / FLORIDA

UNITED STATES DEPARTMENT OF THE INTERIOR
NATIONAL PARK SERVICE

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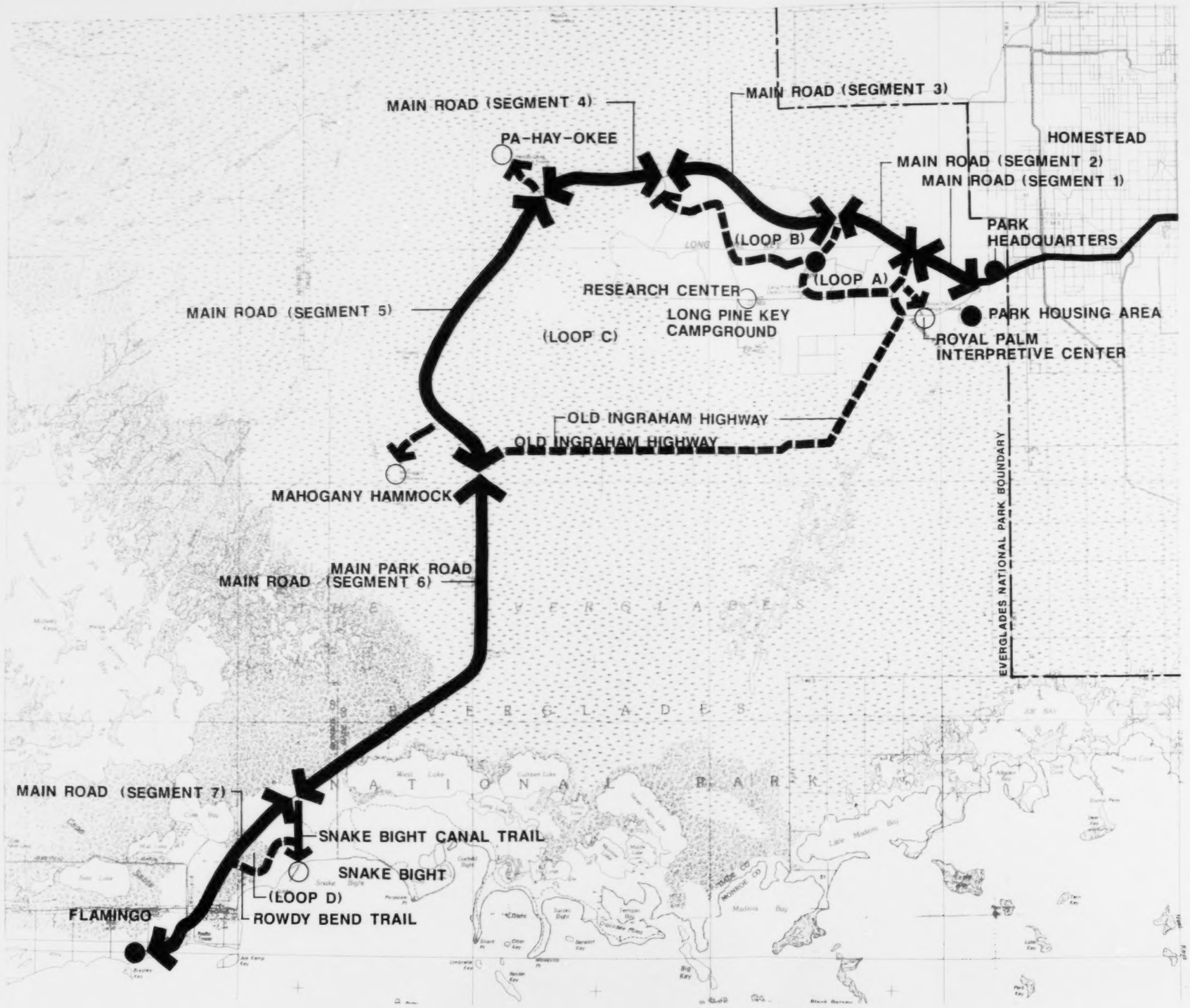

ORIGIN

DESTINATION

MAIN ROAD SEGMENTS

SECONDARY ROAD AND TRAIL SEGMENTS

NORTH 0 1 2 3 MILES

ROAD SEGMENTS

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NATIONAL PARK SERVICE
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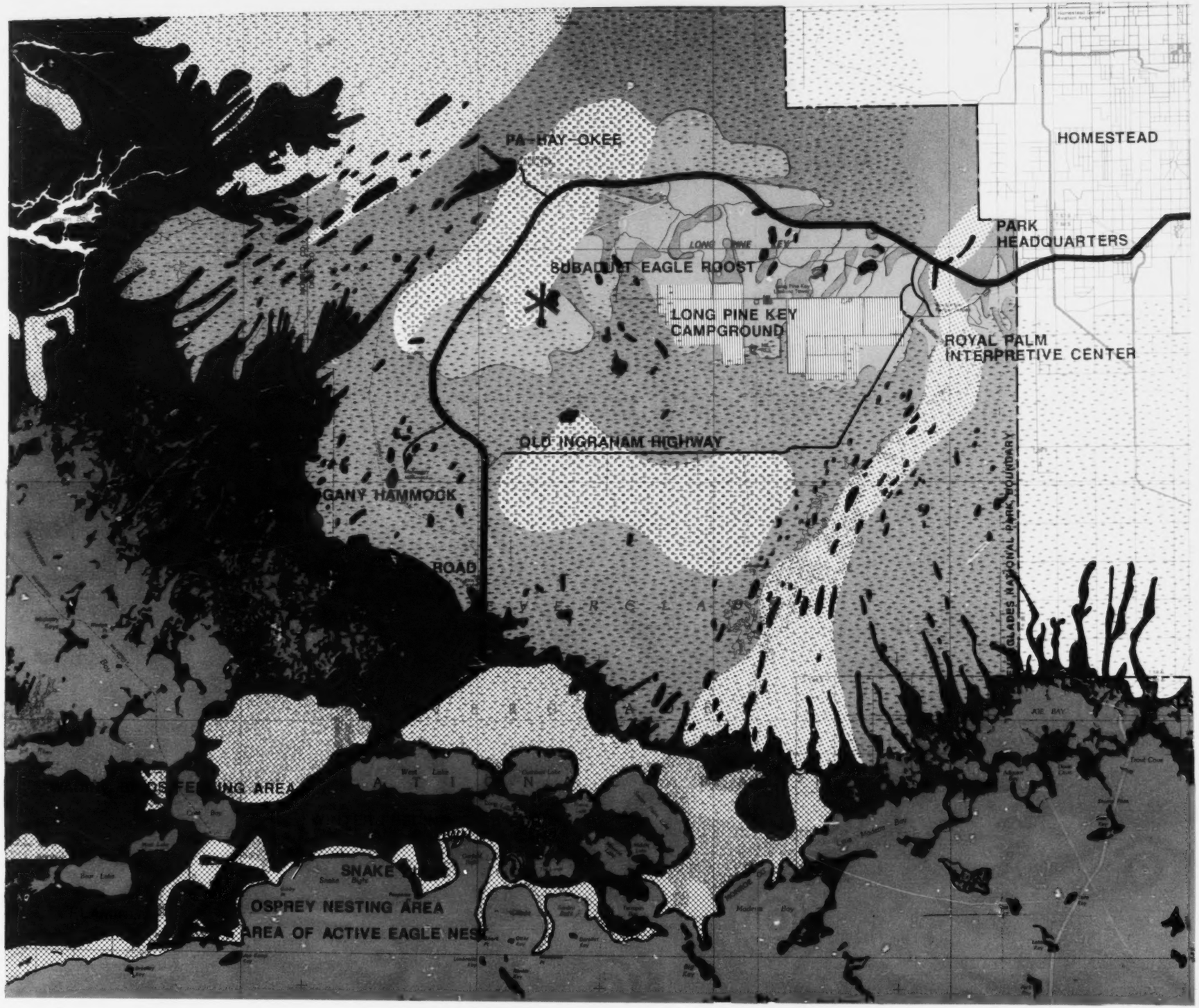

SENSITIVE RESOURCES	AREAS OF OCCURRENCE 1	2	3	4	5	6	7	8	9
FLORIDA PANTHER	X	X	X	X	X	X	X	X	X
CAPE SABLE SEASIDE SPARROW				X			X		
ORCHIDS & BROMELIADS		X						X	
CEREUS GRACILUS (CACTUS)	(COASTAL PRAIRIE TRAIL AREA)								

1 FORMER AGRICULTURAL LAND
2 MANGROVE FOREST
3 CYPRESS PRAIRIE/DOME
4 COASTAL PRAIRIE
5 FRESHWATER SLOUGH
6 PINELANDS
7 FRESHWATER MARL PRAIRIE
8 HARDWOOD HAMMOCK
9 MARINE/ESTUARINE ENVIRONMENT

NORTH 0 1 2 3 MILES

SENSITIVE RESOURCES

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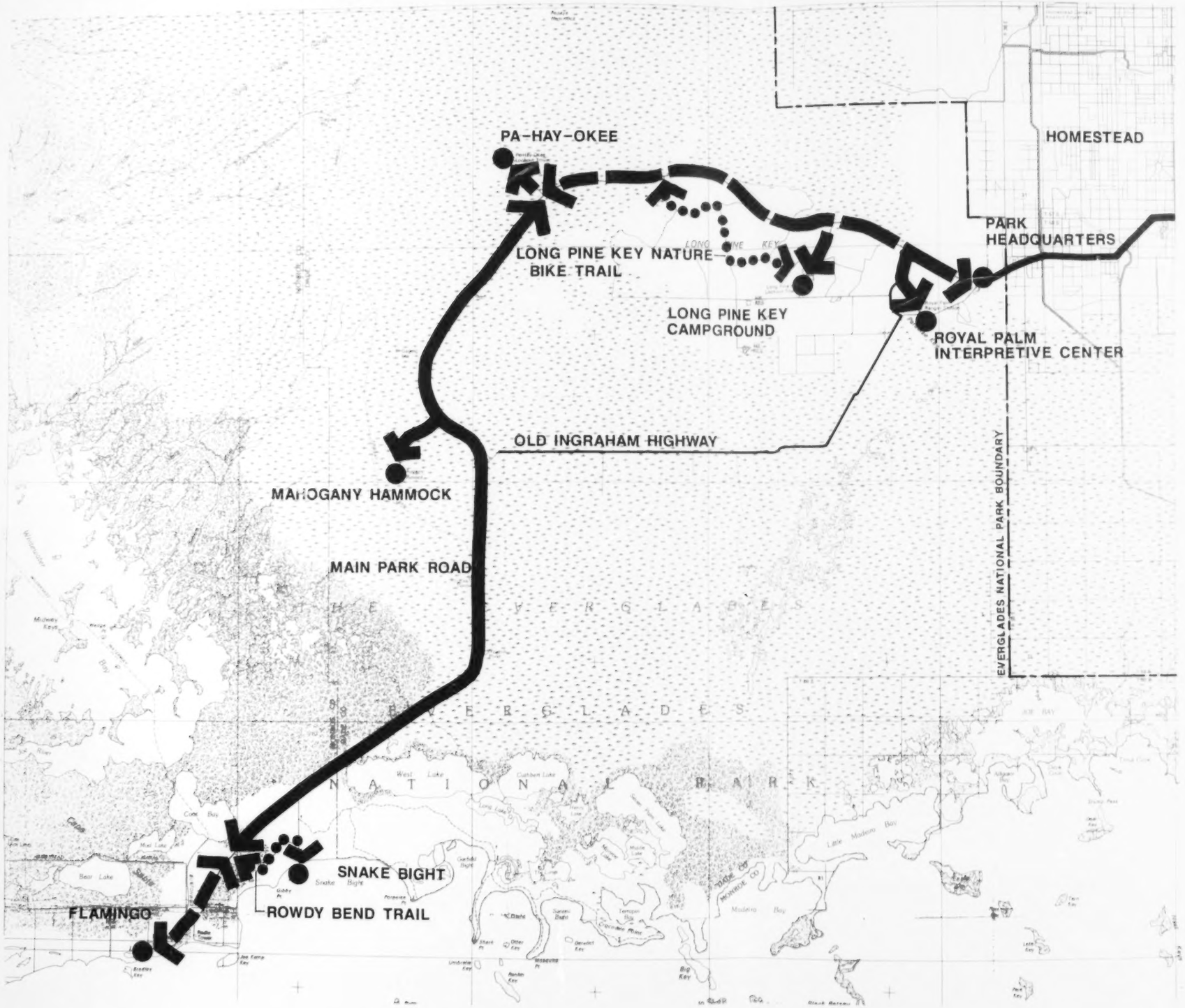
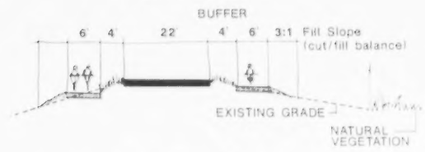
160·40046A·DSC·JUNE 89



BIKE PATH
6' SEPARATED PATH



TARGET USER GROUP: Recreational Riders

TARGET USER GROUP: Touring Bicyclers Only

SCHEMATIC CROSS SECTION

SEPARATE 6'-WIDE, ONE-WAY PATH ON EACH SIDE OF ROAD (all user groups)

4'-WIDE, PAVED ROAD SHOULDER ON EACH SIDE OF ROAD (touring bicyclers)

EXISTING TRAIL (designation only) (all user groups)

NORTH 0 1 2 3 MILES

ALTERNATIVE 1
(preferred alternative)

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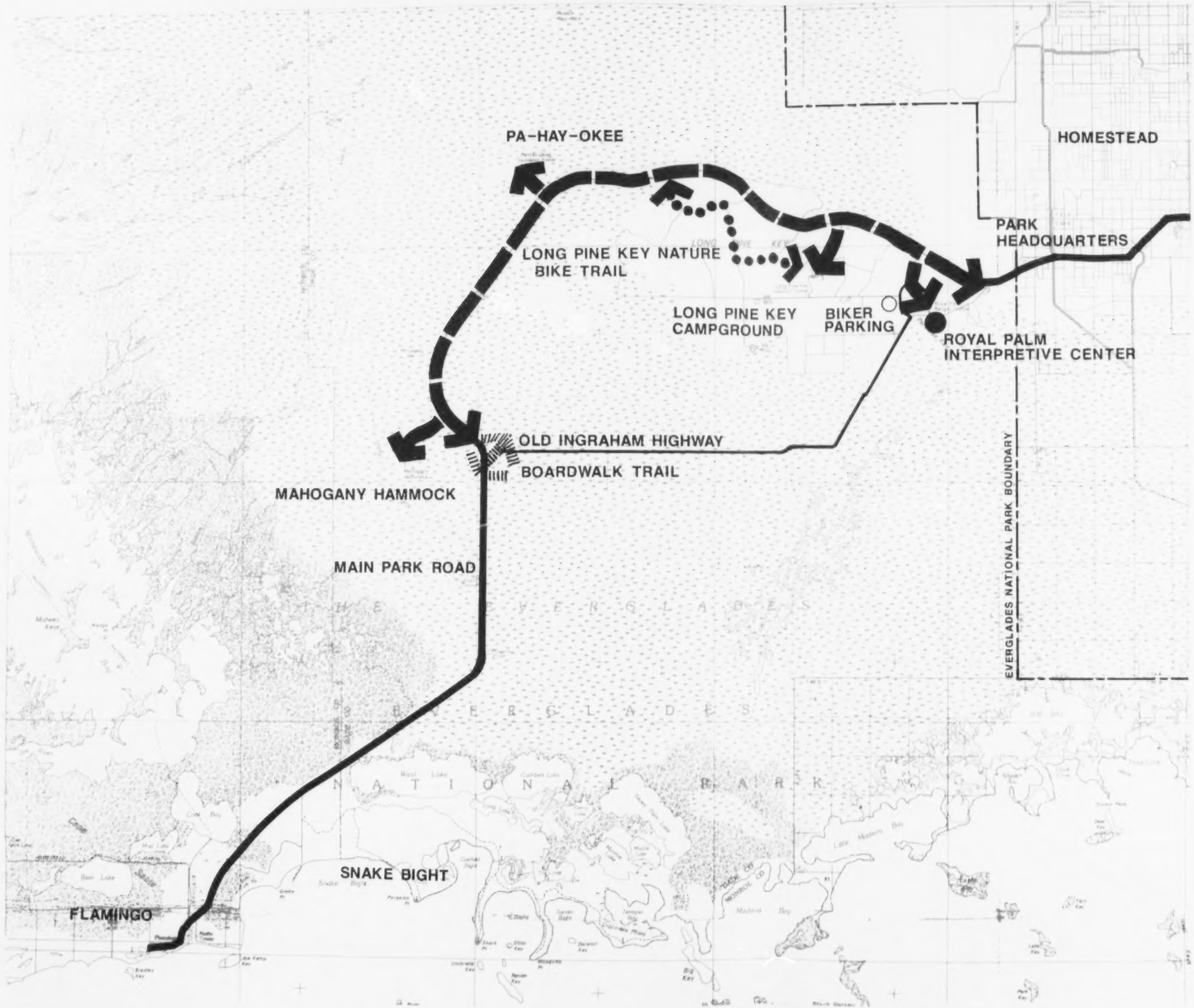

SEPARATE 6'-WIDE, ONE-WAY PATH ON EACH SIDE OF ROAD (all user groups)

4'-WIDE, PAVED ROAD SHOULDER ON EACH SIDE OF ROAD (touring bicyclers)

10'-WIDE, PAVED TWO-WAY BIKE PATH

EXISTING TRAIL (designation only) (all user groups)

ELEVATED BOARDWALK BIKE PATH

NORTH 0 1 2 3 MILES

ALTERNATIVE 2
(long pine loop)

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UNITED STATES DEPARTMENT OF THE INTERIOR
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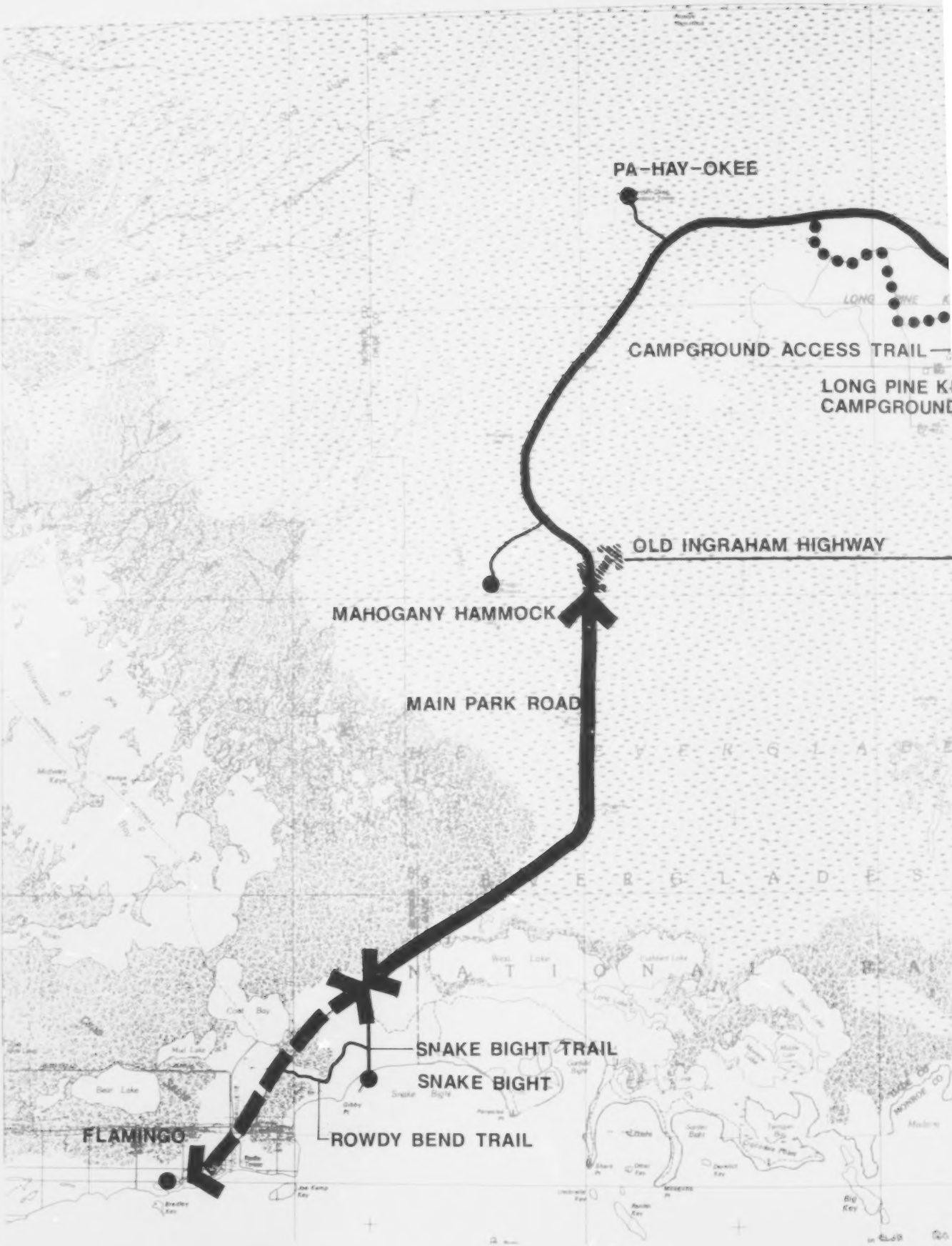
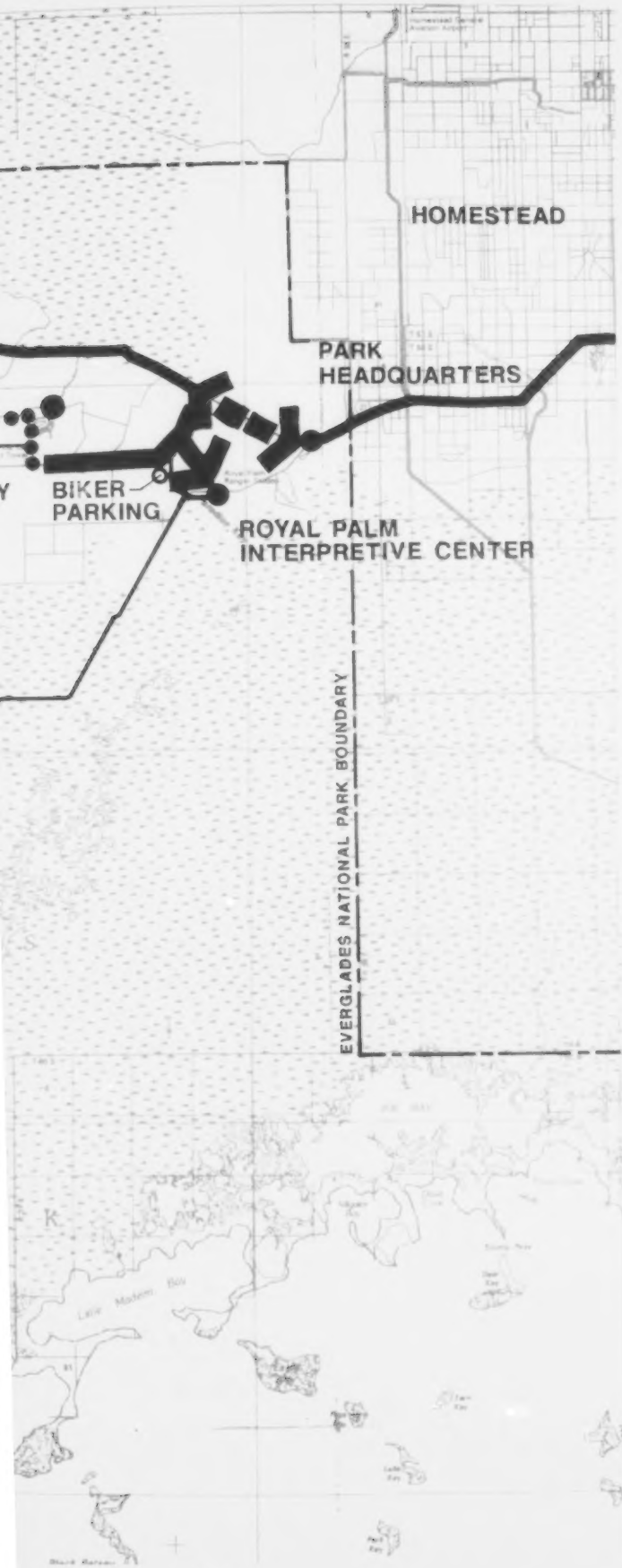

PA-HAY-OKEE
CAMPGROUND ACCESS TRAIL
LONG PINE K
CAMPGROUND
OLD INGRAHAM HIGHWAY
MAHOGANY HAMMOCK
MAIN PARK ROAD
SNAKE BIGHT TRAIL
SNAKE BIGHT
FLAMINGO
ROWDY BEND TRAIL



SEPARATE 6'-WIDE, ONE-WAY PATH ON EACH SIDE OF ROAD (all user groups)

4'-WIDE, PAVED ROAD SHOULDER ON EACH SIDE OF ROAD (touring bicyclers)

10'-WIDE, PAVED TWO-WAY BIKE PATH

EXISTING TRAIL (designation only) (all user groups)

ELEVATED BOARDWALK-BIKE PATH

NORTH 0 1 2 3 MILES

ALTERNATIVE 3
(old ingraham highway/ main park road)

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NATIONAL PARK SERVICE

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NO-ACTION ALTERNATIVE

Under the no-action alternative the main park road from headquarters to Flamingo would be repaved, as is now planned, but no special provisions would be made for bicyclers. Bicycling would continue to be accommodated along this road and side roads, but it would not be encouraged because of safety considerations.

Table 1: Preliminary Cost Estimates (1989 dollars)

Proposed Feature	Alternative 1 Quantity	Alternative 1 Gross Cost	Alternative 2 Quantity	Alternative 2 Gross Cost	Alternative 3 Quantity	Alternative 3 Gross Cost
Bike path – separate 6'-wide, one-way paths on each side of road	24.6 mi	$2,481,000	42 mi	$4,237,000	14.6 mi	$1,472,000
Bike path – 10'-wide, two-way path	n/a		13 mi	2,197,000	13 mi	2,197,000
Bike lane – 4'-wide, paved road shoulder on each side of road	47.6 mi	3,242,000	12.2 mi	832,000	15.6 mi	1,475,000
Vehicle parking for bikers	n/a		30 cars	59,000	30 cars	59,000
Elevated bike path – 10' wide	n/a		0.8 mi	1,660,000	0.8 mi	1,660,000
Bike bridges – 6' wide, one on each side of vehicle bridges	400 ft	283,000	n/a		400 ft	283,000
Gross Construction Subtotal		**$6,006,000**		**$ 8,985,000**		**$7,146,000**
Advance & Project Planning		1,146,000		1,715,000		1,363,000
Total Cost		**$7,152,000**		**$10,700,000**		**$8,509,000**

ENVIRONMENTAL CONSEQUENCES

The three action alternatives discussed in this plan were developed to provide safe and expanded bicycling opportunities without adversely affecting traditional uses in Everglades National Park. Each alternative would include design options to protect and preserve the natural and cultural resources of the park. For example, only the existing disturbed road prism would be used, and no expansion or additional filling in wetlands or other undisturbed vegetation communities beyond the road prism would be done. Any of these alternatives could be undertaken simultaneously with the Federal Highway Administration's project to resurface the main park road.

The consequences of implementing each alternative are presented in table 2. Impacts on natural resources, cultural resources, and visitor safety are discussed.

Table 2: Environmental Consequences

Impact Topic	Alternative 1 – Preferred Alternative	Alternative 2 – Long Pine Loop	Alternative 3 – Old Ingraham Highway / Main Park Road	No-Action Alternative
Surface Water Flow	Reculverting the main park road (as part of the resurfacing project) and also bike lanes and paths would create a more natural surface flow condition.	Same as alternative 1 except Ingraham Highway would also need to be reculverted, which could have a positive effect compared to existing conditions.	Same as alternative 2.	Same as alternative 1, but reculverting would not be required for bike lanes or paths.
Wetlands	Possible short-term increases in turbidity during culverting and fill operations for bike paths (headquarters to Pa-hay-okee – 12.3 mi, Rowdy Bend trail to Flamingo – 2.6 mi), for bike lanes from Pa-hay-okee to the Rowdy Bend trail (18 mi), and for bike lanes on spur roads to the Pa-hay-okee, Royal Palm, Mahogany Hammock, and Pine Island campground (4 mi). No additional fill in wetlands. No significant long- or short-term adverse effects.	Possible short-term increases in turbidity during culverting and surfacing of Ingraham Highway. For main park road, same as alternative 1, except bike path would end at intersection of Ingraham Highway and main park road, with 0.8 mi boardwalk at the west end of Ingraham Highway.	Impacts from construction along Ingraham Highway same as for alternative 2; impacts along main park road same as alternative 1 (2.6 additional mi of bike path). Snake Bight Canal trail loop could need occasional vegetation trimming.	Possible short-term increases in turbidity during culverting when main park road resurfaced. No additional fill required.

Impact Topic	Alternative 1 – Preferred Alternative	Alternative 2 – Long Pine Loop	Alternative 3 – Old Ingraham Highway / Main Park Road	No-Action Alternative
Wilderness	No effect; Long Pine Key nature/bike trail is on an existing fire road excluded from wilderness.	No effect for Long Pine Key nature/bike trail; Ingraham Highway would have to be excluded by Congress as a potential wilderness addition.	Same as alternative 2.	Same as alternative 1.
Endangered or Threatened Species	Possible short-term impacts on birds from noise associated with resurfacing main park road and construction of bike lanes and paths. Possible short-term impacts on panther and alligator movements because of resurfacing and construction. No impacts on any other endangered or threatened species.	Same as alternative 1, plus impacts along Ingraham Highway.	Same as alternative 2.	Same as alternative 1, but for resurfacing project only.
Wildlife	Construction and resurfacing activities could have short-term impacts on wildlife migration (deer, raccoon, opossum, etc.) across main park road and spur roads.	Same as alternative 1, plus additional effect along Ingraham Highway.	Same as alternative 2.	Same as alternative 1.
Water Quality	No effect.	No effect.	No effect.	No effect.

Impact Topic	Alternative 1 – Preferred Alternative	Alternative 2 – Long Pine Loop	Alternative 3 – Old Ingraham Highway / Main Park Road	No-Action Alternative
Air Quality	Short-term impacts from dust during fill operations for bike path/lane construction. Short-term impacts from construction and paving equipment.	Same as alternative 1.	Same as alternative 1.	Same as alternative 1 for resurfacing project only.
Cultural Resources	No impacts on historic or archeological resources because construction would occur on existing fill or along previous roadways.	Same as alternative 1.	Same as alternative 1.	Same as alternative 1.
Visitor Safety	Increased bike rider safety because of bike paths and lanes.	Same as alternative 1.	Same as alternative 2.	No additional safety for bike riders.

Note: No prime or unique farmland soils exist in the project area.

CONSULTATION AND COORDINATION

COMPLIANCE NEEDS

Floodplains and Wetlands Management

Executive Orders 11988, "Floodplain Management," and 11990, "Protection of Wetlands," direct federal agencies to avoid development in floodplains and wetlands whenever there is a practicable alternative and to avoid, to the extent possible, adverse impacts associated with the occupancy or modification of floodplains and wetlands.

Everglades National Park was established not only to protect natural and cultural resources but also to provide for public benefit and enjoyment. To achieve this purpose, management and visitor use facilities are required within the park boundaries. Because the entire park is within the 100-year floodplain and because part of the bike trail is in the coastal high-hazard area, there are no options to place the bike trail outside the 100-year floodplain, or the coastal high-hazard area.

Because the proposed bike trail would be within the 100-year floodplain and a portion within the coastal high-hazard area, measures would be taken to protect life and property and to minimize storm damage. Bike trails and paths would follow existing road prisms already located in the floodplain and high-hazard areas. No critical actions related to this plan would occur in the 500-year floodplain.

A statement of findings will be prepared to document the rationale for locating the bike trail corridor within floodplains and wetlands. This statement of findings will describe mitigating actions to protect life and resource values and to minimize environmental impacts. Approval of the statement of findings by the NPS director is required prior to implementation of the plan.

Coastal Zone Management

The National Park Service has reviewed Florida's coastal zone management program, and formal review of this draft plan will be used as the means for consulting with the Florida Department of Environmental Regulation, Office of Coastal Zone Management. Based on its review of the state's coastal zone management program, the Park Service believes that the proposal and alternatives comply with the program. The Park Service will review the final proposal for the Everglades National Park bicycle trail system and will submit a formal consistency determination to the state, in accordance with the 1972 Coastal Zone Management Act, as amended, and its implementing regulations (15 CFR 930).

Endangered or Threatened Species

In November 1988 the National Park Service consulted with the U.S. Fish and Wildlife Service and the National Marine Fisheries Service concerning endangered or threatened species within the project area. The National Marine Fisheries Service responded that there are no listed endangered or threatened species within their jurisdiction within the project area. The U.S. Fish and Wildlife Service responded that there are seven endangered species, three threatened species, and three species with critical habitat designation within the project area (see appendix A). Further informal consultation with the Fish and Wildlife Service has revealed a possible need for a biological assessment of the project impacts on

these species. Since this project would be scheduled for construction in 1992, the National Park Service proposes that the biological assessment be done six months before construction begins. This delay would allow the biological assessment to be a more complete and timely document, especially if any species were added or deleted from the list in the meantime.

Water Quality

Associated fill and construction activities involved in reculverting and adding a bike path or bike lane along the main park road will comply with requirements of section 404 of the Federal Water Pollution Control Act, section 10 of the Rivers and Harbors Act, chapters 17-3 and 17-4 of the Florida Administrative Code, and other applicable regulations. Turbidity during construction will be limited by booms, silt fences, or other methods as necessary. In the worst case, activities may cause only temporary, localized siltation.

In order to determine the placement and parameters associated with the installation of additional culverts along the main park road, a culverting plan will be developed. Implementation of the culverting plan will need to comply with all federal and state regulations as outlined above.

Cultural Resources

No adverse effects on archeological resources are expected; however, the Southeast Archeological Center will be asked to evaluate the potential for archeological damage for each alternative.

REVIEWING AGENCIES AND ORGANIZATIONS

Federal Agencies

Advisory Council on Historic Preservation
Department of Commerce
    National Oceanic and Atmospheric Administration, National Marine Fisheries Service
Department of Defense
    U.S Army Corps of Engineers
Department of the Interior
    U.S. Fish and Wildlife Service
Federal Emergency Management Agency

State, Regional, and Local Agencies

Florida Department of Environmental Regulations
Florida Department of Natural Resources
Florida Department of Transportation
Florida State Historic Preservation Officer

South Florida Water Management District

Dade County
Board of County Commissioners
Department of Environmental Resource Management
Bicycle Trail Coordinator

Local Organizations

Homestead Bicycle Club
Miami Bicycle Club

APPENDIX A: THREATENED OR ENDANGERED SPECIES

Common Name	Scientific Name	Status*
Mammal		
Florida panther	*Felis concolor coryi*	E
Birds		
Cape Sable seaside sparrow	*Ammospiza maritima mirabilis*	E, CH
Piping plover	*Charadrius melodus*	T
Arctic peregrine falcon	*Falco peregrinus tundrius*	E
Bald eagle	*Haliaeetus leucocephalus*	E
Wood stork	*Mycteria americana*	E
Florida Everglade kite	*Rostrhamus sociabilis plumbeus*	E, CH
Reptiles		
American crocodile	*Crocodylus acutus*	E, CH
Eastern indigo snake	*Drymarchon corais couperi*	T
Plant		
Garber's spurge	*Euphorbia garberi*	T

* E = endangered, T = threatened, CH = critical habitat designated.

PLANNING TEAM

Denver Service Center

Dennis Piper, Park Planner/Landscape Architect
Michael Bilecki, Natural Resource Specialist
Tom Murphy, Landscape Architect

Harpers Ferry Center

Larry Tillman, Interpretive Planner

Everglades National Park

Michael Finley, Superintendent
Robert Arnberger, Assistant Superintendent
Keith Whisenant, Resources Management Coordinator
Scott Ericson, Chief Ranger
Russ Balch, Park Engineer
George Frederick, Concessions Management Specialist
Skip Snow, Backcountry Management Specialist
Bob Doren, Vegetation Management Specialist

Consultants

Jeffrey Hunter, Dade County Bicycle Coordinator
Robert Schreffler, FHWA Coordinator, Denver Service Center

Southeast Regional Office Liaison

Rick McCollough

*U.S. GOVERNMENT PRINTING OFFICE: 1989-0-673-038/00009

As the nation's principal conservation agency, the Department of the Interior has basic responsibility for most of our nationally owned public lands and natural and cultural resources. This includes fostering wise use of our land and water resources, protecting our fish and wildlife, preserving the environmental and cultural values of our national parks and historical places, and providing for the enjoyment of life through outdoor recreation. The department assesses our energy and mineral resources and works to ensure that their development is in the best interests of all our people. The department also promotes the goals of the Take Pride in America campaign by encouraging stewardship and citizen responsibility for the public lands and promoting citizen participation in their care. The department also has a major responsibility for American Indian reservation communities and for people who live in island territories under U.S. administration.

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